A LEGAL AND ECONOMIC ANALYSIS OF THE TRI-STATE WATER WARS

by

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Abstract

Water is essential for all human life and, thus, serves as the keystone of any prosperous nation. One can look back thousands of years into the known history of human civilizations and see the evolution (and revolution) of how mankind has come to govern its water. Taking a look around the world, it's easy to see the devastating impacts of inadequate water supply on both human life and the environment, as a whole, but it is more difficult to see the extent to which a water-rich society may take this vital resource, and the way-of-life it has enabled, for granted.

The Tri-State Water Wars, as it has come to be known, refers to the collective, on-going series of legal disputes between Georgia, Alabama, and Florida over rights to the shared water resources of the Alabama-Coosa-Tallapoosa (ACT) and Apalachicola-Chattahoochee-Flint (ACF) River Basins. In 2013, the State of Florida filed a lawsuit against the State of Georgia in the Supreme Court of the United States in regard to the waters of the ACF River Basin. This paper will explore some of the most politically, economically, and legally compelling issues embedded in the dispute.

All three states have unique claims to the shared waters of the ACF Basin, from Metro Atlanta growing population and demand, to south Georgia's agricultural irrigation, to Alabama's nuclear power plant, to Florida's oysters and endangered species. The Supreme Court will likely decide before the end of the year whether or not they will take the case. If they do take the case, the trial will likely drag out for multiple years; thus, any immediate resolution sought by Florida may be delayed. Regardless of the outcome, each stakeholder in the ongoing Tri-State Water Wars litigation must determine how it will accommodate future demand increases and how future supplies may play a role in meeting this demand.

Table of Contents

Introduction

Water is essential for all human life and, thus, serves as the keystone of any prosperous nation. One can look back thousands of years into the known history of human civilizations and see the evolution (and revolution) of how mankind has come to govern its water. Taking a look around the world, it's easy to see the devastating impacts of inadequate water supply on both human life and the environment, as a whole, but it is more difficult to see the extent to which a water-rich society may take this resource, and the way-of-life it has enabled, for granted.

The abundance of freshwater in the United States varies by region, but in general, the dichotomy of water in the US is divided into East and West. The Eastern states experience far more precipitation and freshwater availability than their Western counterparts. However relatively abundant the water may be, there seems to be contentions revolving around this vital resource in both the East and West. This paper will explore a 20+ year-old feud between three southeastern states and *their* water, a feud known as the Tri-State Water Wars.

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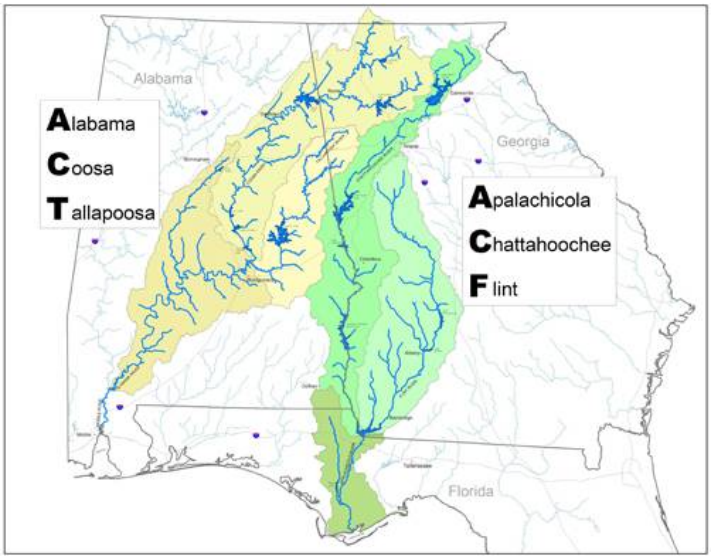

Figure 1. ACT and ACF River Basins.

The ACF is home to five dams (ACF Project) constructed and operated by the US Army Corps of Engineers (Corps). The dam of most particular interest is the Buford Dam, located northeast of Atlanta, which retains the largest of the five Corps reservoirs, Lake Sidney Lanier (Lake Lanier), holding ~62% of the entire capacity of the ACF Project and birthplace of the original litigation that sparked the Tri-State Water Wars in 1990. This paper will explore some of the most

[1] Atlanta Regional Commission, "Tri-State Water Wars,"(Atlanta, Georgia 2014).

politically, economically, and legally compelling issues surrounding the current dispute within the ACF River Basin.

The predominant water uses and demands that will be covered in this paper include: the growing demand of public water supply in north Georgia, namely, the Metro Atlanta area; the heavy reliance on groundwater for agricultural irrigation in south Georgia; the Joseph M. Farley Nuclear Plant's necessary surface water withdrawals to maintain it's cooling operations in southeast Alabama; the local oyster industry of Apalachicola Bay, Florida; and the endangered and threatened aquatic species living within the Apalachicola River in Florida.

Data & Methods

This paper covers a wide range of integral issues imbedded within the Tri-State Water Wars and utilizes a variety of information and data, including legal, legislative, financial, economic, and scientific research and reports. The data gathered and incorporated into this paper are, unless specified otherwise, annual measures for the year 2012; more recent versions of many of the more critical data were not available at the time of this research.

The quantitative data obtained for this paper were aggregated with into Microsoft Excel spreadsheets as summary tables based on state and subject matter then visualized using relevant charts and graphs. The data acquired include: volumetric surface and groundwater withdrawals, direct and indirect revenues attributed or connected to water withdrawals, and population measures.

The information used in this paper was compiled from a variety of both public and non-public sources, ranging from annual public utility to federal agency reports and state Open Records Act requests. This is not a comprehensive list of all water uses and revenues within the ACF Basin but merely serves to highlight some of the fundamental drivers behind the predominant water uses in the ACF.

This paper does not include hydrological analyses of net losses to the system or water quality. However, future research would help address one of the bigger questions that has often gone unanswered: how much water should we leave *in* the river and *in* the ground? Maintaining ecological flows is certainly important, but quantifying those flows and understanding the connectivity between surface water and groundwater are not simple tasks. Perhaps the resolution to the Tri-State Water Wars will stem from the establishment of protected minimum flows throughout the basin, leaving the prevalent demands to manage their water consumption accordingly.

Section 1: Background

The Apalachicola-Chattahoochee-Flint River Basin (ACF) spans 19,800 square miles across Georgia, Alabama, and Florida, covering 50 counties in Georgia, 10 counties in Alabama, and 8 counties in Florida (see Figures 2 and 3, Appendix). As indicated by the name, the ACF Basin consists of three predominant rivers, the Chattahoochee, Flint, and Apalachicola Rivers.[2]

The headwaters of the Chattahoochee River are located in the southern Blue Ridge Mountains in northeast Georgia. From there, the river flows southwest through Atlanta, eventually forming the southern half of the Alabama-Georgia state line. The river stretches some 430 miles before merging with the Flint River. The source of the Flint River is located in the southern outskirts of the Atlanta metropolitan area. The river follows a windy, southern course for 200 miles. The two rivers converge at the Georgia-Florida state line, forming the Apalachicola River. The Apalachicola River flows 112 miles, unimpeded, before emptying into Florida's Apalachicola Bay, an inlet of the Gulf of Mexico.

I. Hydroelectric Power Generation

The history of hydroelectric power generation in the United States dates back to 1880, when the water turbine at the Wolverine Chair Factory was attached to a dynamo direct current (DC) generator to power sixteen storefront lamps in Grand Rapids, Michigan.[3] Just two years later, the first hydroelectric power plant began operation on the Fox River in Appleton, Wisconsin.[4] By 1889, two hundred plants used hydropower for some or all of their electricity generation.[5]

On March 3, 1899, the Rivers and Harbors Appropriation Act of 1899 made it illegal to dam a navigable river without a permit from Congress.[6] Through the turn of

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[2] Georgia Water Science Center, "The Apalachicola-Chattahoochee-Flint (Acf) River National Water Quality Assessment (Nawqa) Program Study," US Geological Survey, http://ga.water.usgs.gov/nawqa/

[3] Office of Energy Efficiency & Renewable Energy, "History of Hydropower," US Department of Energy, http://energy.gov/eere/water/history-hydropower

[4] The Library of Congress, "Gilded Age (1878-1889)," The Library of Congress, http://www.americaslibrary.gov/jb/gilded/jb_gilded_hydro_1.html

[5] Georgia Water Science Center, "The Apalachicola-Chattahoochee-Flint (Acf) River National Water Quality Assessment (Nawqa) Program Study".

[6] March 3, 1899, Ch. 425, Sec. 9, 30 Stat. 1151. 33 U.S.C. § 407

the century, numerous hydroelectric designs and plant styles were being developed and implemented.[7] By 1907, hydropower accounted for 15% of the US electricity generation and 25% by 1920.[8]

II. Legislative History: ACF Project and the US Army Corps of Engineers

On March 3, 1925, Congress initialized an investigation into the feasibility of hydroelectric facilities within the ACF Basin with the River and Harbor Act of 1925 (RHA).[9] In 1939, the US Army Corps of Engineers (Corps) produced a report that would be known as the Park Report, for the report's author, District Engineer Colonel R. Park.[10] The Park Report covered eleven projects under consideration and referred to a number of "principal direct benefits." These benefits included transportation, hydroelectric power, national defense, commercial value of riparian lands, recreation, and industrial and municipal water supply.[11]

On March 2, 1945, Congress adopted the Park Report in full and incorporated it into the RHA of 1945, thereby authorizing the Corps to begin construction on the Jim Woodruff Dam, creating Lake Seminole at the confluence of the Chattahoochee and Flint Rivers, located at the Georgia-Florida state line.[12] The Corps published a new report that would be known as the Newman Report, for the report's author, Division Engineer Brigadier General James B. Newman.[13] The Newman Report made a number of recommendations to amend the original plan for the ACF system. Among these recommended amendments was to combine several of the previous hydroelectric sites to create one large reservoir in Buford, Georgia, which would become the modern-day Lake Sidney Lanier (Lake Lanier). The report cited increased power generation and better downstream flow regulation as reasons for this particular revision.

On July 24, 1946, after approving and incorporating the Newman Report into the bill, Congress passed the RHA of 1946, thereby authorizing the Corps to begin

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[7] US Bureau of Reclamation, "The History of Hydropower Development in the United States," http://www.usbr.gov/power/edu/history.html.
[8] Atlanta Regional Commission, "Tri-State Water Wars."
[9] River and Harbor Act of 1925, Pub. L. No. 68-585, ch. 467, 43 Stat. 1186, 1194 (March 3, 1925)
[10] H.R. Doc. No. 76-342, at 25-26 (June 16, 1939)
[11] Id
[12] Pub. L. No. 79-14, 59 Stat. 10, 17 (1945)
[13] H.R. Doc. No. 80-300, ¶ 69 (1947)

construction of the Buford Dam.[14] Because the Park and Newman Reports were incorporated into their respective bills in full, these reports became part of the authorizing legislation for the ACF system projects and hold significance when analyzing the legal questions brought up in the Tri-State Litigation.

In 1949, the Corps released the "Definite Project Report" and began construction on the Buford Dam the following year.[15] With a total cost of $47 million, the Southeastern Power Administration, a federal agency, paid $30 million of the construction costs. Prior to the dam's construction, the cities of Buford and Gainesville were withdrawing water directly off of the Chattahoochee River; however, the dam's reservoir inundated the intake structures. As a result, the Corps signed agreements with Buford and Gainesville to withdraw water directly from the reservoir. Construction of Buford Dam was completed in 1957. By 1975, the Corps had completed construction on all five federally operated hydroelectric dams in the ACF system. Of these five dams, Buford Dam had the largest reservoir, with approximately 62.5% of the entire ACF Basin Project's storage capacity.[16]

[14] H.R. 6407, Public Law 525; Pub. L. No. 79-525, 60 Stat. 634; http://planning.usace.army.mil/toolbox/library/PL/RHA1946.pdf

[15] U.S. Army Corps of Engineers: Mobile District, Definite Project Report on Buford Dam Chattahoochee River, Georgia, ¶ 48 (1949)

[16] Carol A. Couch, et al., "Influences of Environmental Settings on Aquatic Ecosystems in the Apalachicola-Chattahoochee-Flint River Basin,"(Atlanta, Georgia: United States Geological Survey, 1996).

Section 2: Legal Overview

This section provides a summary of the major legal actions taken in the water rights litigation between Georgia, Alabama, and Florida and highlights some of the key elements that the courts relied upon in their decisions. This section relies heavily on the opinions of the individual cases, most importantly, the opinion of the 11th Circuit Court of Appeals from 2011.

The Tri-state Water Wars has been ongoing for over 20 years and has now made it into the realm of the Supreme Court of the United States. In November of 2013, the State of Florida filed a lawsuit against the State of Georgia over its management of the waters of the ACF River Basin; the Supreme Court has original jurisdiction over lawsuits between states.

To date, the Supreme Court has not decided whether or not it will see the case. If the Court sees the case, the trial will likely last multiple years, and any resolution Florida might hope to attain will not be immediate. And so, it is important to look at the legal history leading up to where we stand today.

Litigation History

On June 28, 1990, the State of Alabama filed a lawsuit against the US Army Corps of Engineers (Corps).[17] This, the first lawsuit of the Tri-State Water Wars, was sparked by a proposal made by the Corps to reallocate 22% of the water normally reserved for hydropower generation in Lake Lanier to public water supply.[18] Alabama challenged the Corps' management of reservoirs in both the ACF and ACT River Basins, including Lake Sidney Lanier. The main argument was that the Corps did not have the authority to reallocate Lake Lanier's reservoir for public water supply, according to the Water Supply Act of 1958.[19][20]

In an attempt to negotiate an agreement, Alabama and the Corps jointly moved for a stay of proceedings. After the stay was granted, the litigation remained dormant

[17] Northern District of Alabama United States District Court, Eastern Division, in *Case 1:90-cv-01331-KOB*(US Government Printing Office, 2005).
[18] Id.
[19] Rhett, Turner et al., "Water War History," http://waterwar.org/history.html
[20] US Governemnt Printing Office, "Development of Water Supplies for Domestic, Municipal, Indusrial, and Other Purposes," (2010).

until 2003.[2122] However, the stay was granted on the terms that the parties agree to come to an agreement on a formula for allocating the waters of the ACF Basin. As a result, the Apalachicola-Chattahoochee-Flint River Basin Compact was signed into federal law in November 1997, creating the ACF Basin Commission.[23] The deadline for the states to reach an agreement over the allocation of the water was extended several times, but on August 31, 2003, it became clear that the states could not reach an agreement and the compact was terminated after passing the deadline.[24]

On December 12, 2000, the Southeastern Federal Power Customers, Inc. (SeFPC), frustrated by the outcome of the Alabama case, filed a lawsuit against the Corps in US District Court for the District of Columbia, claiming damages of lost revenue from hydropower production due to the Corps' reallocation of Lake Lanier's water supply.[25] On January 16, 2003, the parties reached a settlement agreement.[26]

Within a month of the settlement agreement, Alabama and Florida revived the Alabama case by seeking preliminary injunction from the Alabama Court. The plaintiffs claimed that the Corps did not have the statutory authorization to enter into the DC settlement agreement. On October 15, 2003, the Corps was found by the Alabama Court to have violated the 1990 stay.

In 2004, the DC Court declared the DC settlement agreement was "valid and approved." The DC Court subsequently dismissed the DC case in light of the settlement, and Alabama and Florida appealed the DC Court's approval of the DC settlement agreement in the US Court of Appeals for the DC Circuit.

On March 21 2007, the ACF claims were consolidated with Florida v. U.S. Fish and Wildlife Service in the Middle District of Florida; Judge Paul A. Magnuson, District

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[21] United States Court of Appeals for the Eleventh Circuit, "In Re: Mdl-1824 Tri-State Water Rights Litigation,"(2011).
[22] Stephen E. O'Day, et al. , "Wars between the States in the 21st Century: Water Law in an Era of Scarcity," *Vermont Journal of Environmental Law* 10, no. 2 (2009).
[23] US Government Printing Office, "Public Law 105–104, 105th Congress,"(1997).
[24] Josh Clemons, "Water-Sharing Compact Dissolves: States Fail to Agree before August 31 Deadline," Mississippi-Alabama Sea Grant Legal Program, http://masglp.olemiss.edu/Water%20Log/WL23/23.3watershare.htm.
[25] "Se. Fed. Power Customers Inc. V. Caldera,," in *No. 1:00-cv-02975*(D.C. District Court, 2000).
[26] Id.

of Minnesota, was appointed to hear the case.[27][28][29] The case was focused on the Corps' authority for its operation of the project. The court's order concluded that the Corps had exceeded its authority in its "de facto" reallocation of storage to accommodate current water supply withdrawals.[30]

In 2011, a three-judge panel of the Eleventh Circuit Court of Appeals overturned the 2009 District Court ruling. However, the panel did not expressly uphold the Corps' water supply authorizations, instead, remanded the matter to the Corps to make a final determination about its authority to allocate water in Lake Lanier to public water supply.[31] As a result, the Corps' has since been in the process of updating its Master Water Control Manual for the ACF Basin.

The Corps is currently in the process of drafting the updated ACF Master Water Control Manual and anticipates the Manual will be finalized and implemented by fall of 2015 (see Figure 4).

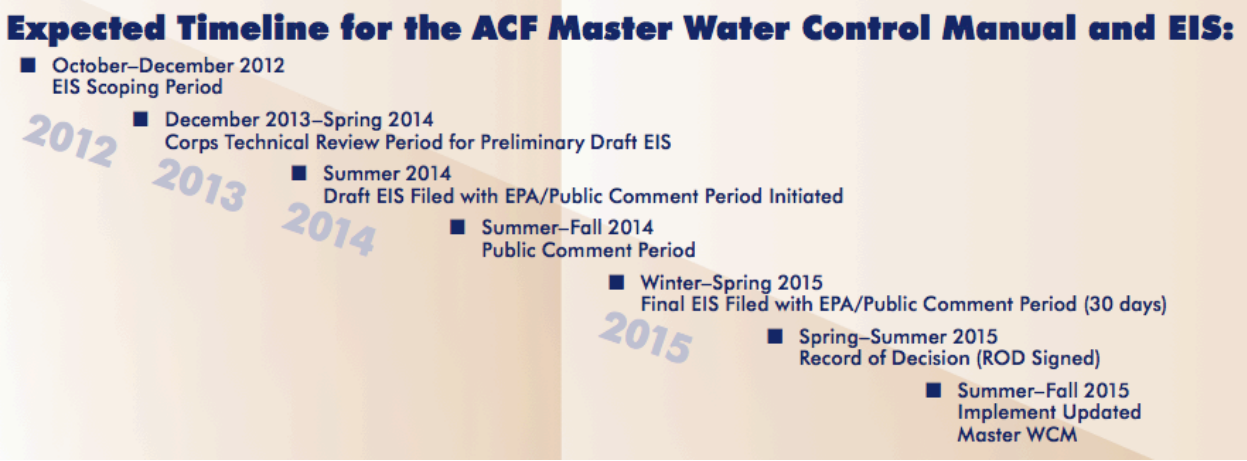

Figure 4. US Army Corps of Engineers Expected Timeline[32]

Given the legal history leading up to this point, it's clear that the Corps has some important decisions to make regarding its management of the 5 federal dams in the ACF Project. Meanwhile, all three states continue to assert their claims to the water in

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[27] "Complaint for Declaratory and Injunctive Relief, Florida. V. Us Fish and Wildlife Service," in *No. 4:06* (Northern District of Florida 2006).
[28] "In Re Tri-State Water Rights Litigation," in *No. 3:07* (Middle District of Florida 2007).
[29] See supra 19
[30] See supra 18
[31] Id
[32] United States Army Corps of Engineers, "ACF Master Water Control Manual Update." 2014.

this seemingly endless game of *tug-of-war*. The following section will explore the prominent water uses and demands of each state in the ACF Basin for 2012. This may provide a snapshot of both the volume of and revenue attributed to water withdrawals from the states' largest stakeholders.

Section 3: Analysis

I. Georgia

The vast majority of the ACF River Basin falls within the state of Georgia. Accordingly, the majority of the water withdrawals and uses of the water lie within its borders. The largest collective water uses are the Metro Atlanta area and agricultural groundwater irrigators in South Georgia. The sharp contrast between the two uses is the reliance on surface water in North Georgia and groundwater in South Georgia.

Metro Atlanta

People often refer to "Atlanta" as one of the big players in the Tri-State Water Wars; however, these same people are likely referring, either consciously or subconsciously, to the Atlanta-Sandy Springs-Roswell Georgia Metropolitan Statistical Area (Metro Atlanta). The US Office of Management and Budget (OMB) designates Metropolitan Statistical Areas (MSA), and in 2012, the Metro Atlanta MSA was comprised of 28 counties. With an estimated population of 6.1 million, Metro Atlanta accounts for approximately 62% of Georgia's population.[33]

Since the completion of Buford Dam in 1957, the population of Metro Atlanta has grown from 1.3 million in 1960 to 5.3 million in 2010 (see Figure 5).[34] This substantial increase in population has raised the issue of future water resource availability. Many have criticized the unhindered growth of Metro Atlanta and its attitude toward water.

[33] US Census Bureau, " Largest Us Metropolitan Areas by Population, 1990-2010,"(World Almanac and Book of Facts 2012).
[34] " Census, 1960-2010," Boston Globe, June 11, 2002, third edition, LexisNexis Academic.

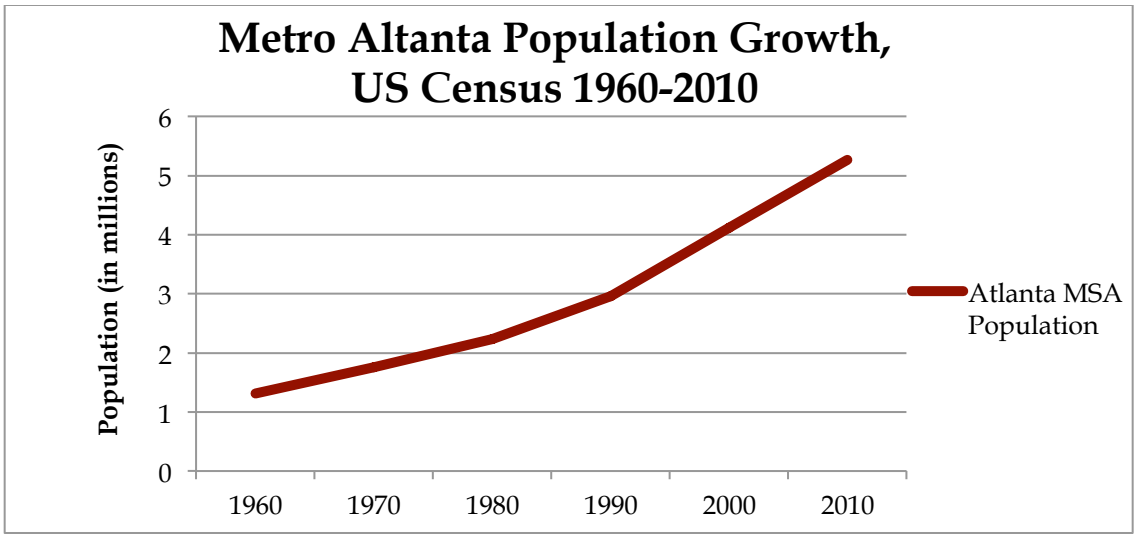

Figure 5. Metro Atlanta Population Growth[35]

As mentioned previously, there are three utilities that are permitted to withdraw water directly from Lake Sidney Lanier: Gainesville, Buford, and Gwinnett County. However, Metro Atlanta's current and future water demand is best assessed my means of the Metropolitan North Georgia Water Planning District (Metro Water District). In 2001, the Georgia General Assembly created the Metro Water District to serve as the water planning organization for the greater metropolitan Atlanta area.[36] The Metro Water District is comprised of 15 counties and 91 municipalities (see Figure 6, Appendix).[37] The 4 largest water withdrawals in the Metro Water District are attributed to: the City of Atlanta, Gwinnett County, DeKalb County, Cobb County, and Fulton County (see Figure 7).

[35] Id.
[36] Atlanta Regional Commission, "2010 Water Metrics Report,"(Metropolitan North Georgia Water Planning District, 2011).
[37] Id.

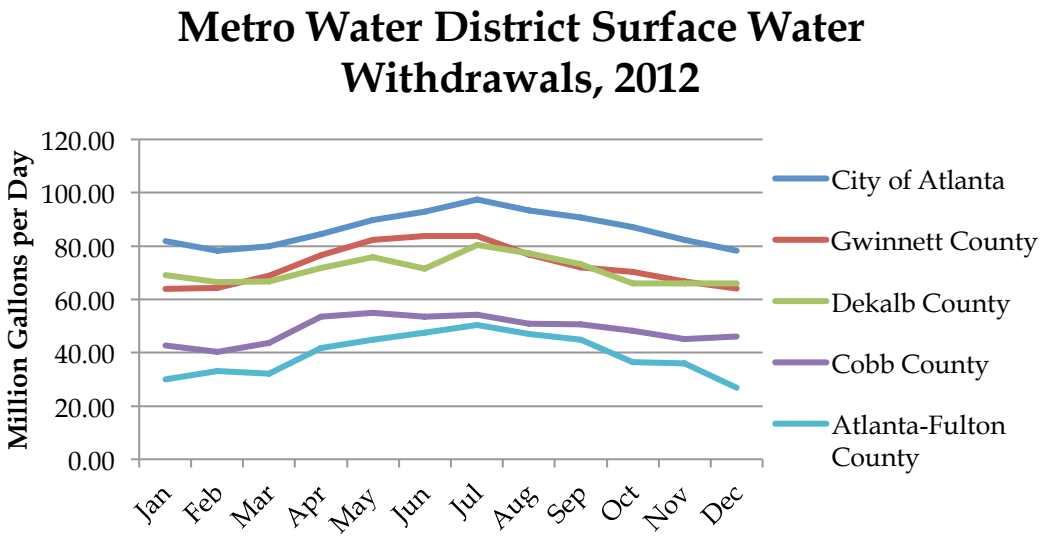

Figure 7. Five Largest Municipal Withdrawals in Metro Water District[38]

Due to limited availability, all water and sewer revenue data for utilities in the Metro Water District for 2012 were not accounted for in this project. The only representative data retrieved was for the two largest water withdrawals in the Metro Water District, the City of Atlanta and Gwinnett County for 2010 and 2008, respectively. In 2010, the City of Atlanta generated over $340 million from water and sewer revenues, and Gwinnett County generated over $188 million in 2008.[39][40]

If Metro Atlanta continues to grow at this rate, it may eventually find that it is unable to sufficiently supply water to its citizens, given it's current water resources. But resolutions to this, and other issues, may ultimately be decided in through litigation and/or the Corps' Updated ACF Water Control Manual. But, in any event, proactive measures must be taken to minimize the extent of the ever-increasing water demand.

Agricultural Irrigation

Agriculture has played an integral role in Georgia's economy for hundreds of years. In 2012, Georgia's crop commodity cash receipts amounted to over $4.47 billion.[41] Not all of these crops were fed by irrigation, but many were. Herein lies one of the more

[38] Georgia Environmental Protection Division, "2012-North Metro Surface Water Withdrawals," ed. Open Records Request(2014).
[39] City of Atlanta, "Adopted Budget: Fiscal Year 2012."
[40] Department of Water Resources, "Annual Report 2008,"(Gwinnett County, Georgia: Department of Water Resources).
[41] "Georgia Agricultural Facts (2012)," (USDA, NASS Georgia Field Office, 2013).

complex issues regarding the Tri-State Water Wars, the use of surface and groundwater for irrigation of crops in south Georgia, where the majority of the state's agricultural sector resides. Many of the crops grown in south Georgia, more specifically the lower Flint River Basin, are not solely dependent on irrigation to meet its water requirements. However, the threat of a major drought, coupled with USDA quality standards that must be met for certain vegetable crops, provides ample incentive for farmers to utilize the seemingly abundant water resources abutting and beneath their lands.

The acreage of irrigated crops in Georgia increased significantly during the 1970's; the crops responsible for the majority of this increase were corn and peanuts (see Figure 8).[42] Beginning around 1992, Georgia experienced another period of growth, predominantly driven by an increase in cotton irrigation.[43] As opposed to municipal and industrial water withdrawals, the majority of which are discharged back into the streams from which they came, agricultural withdrawals for irrigation consume most, if not all, of their withdrawals with little to no returns to the source stream.

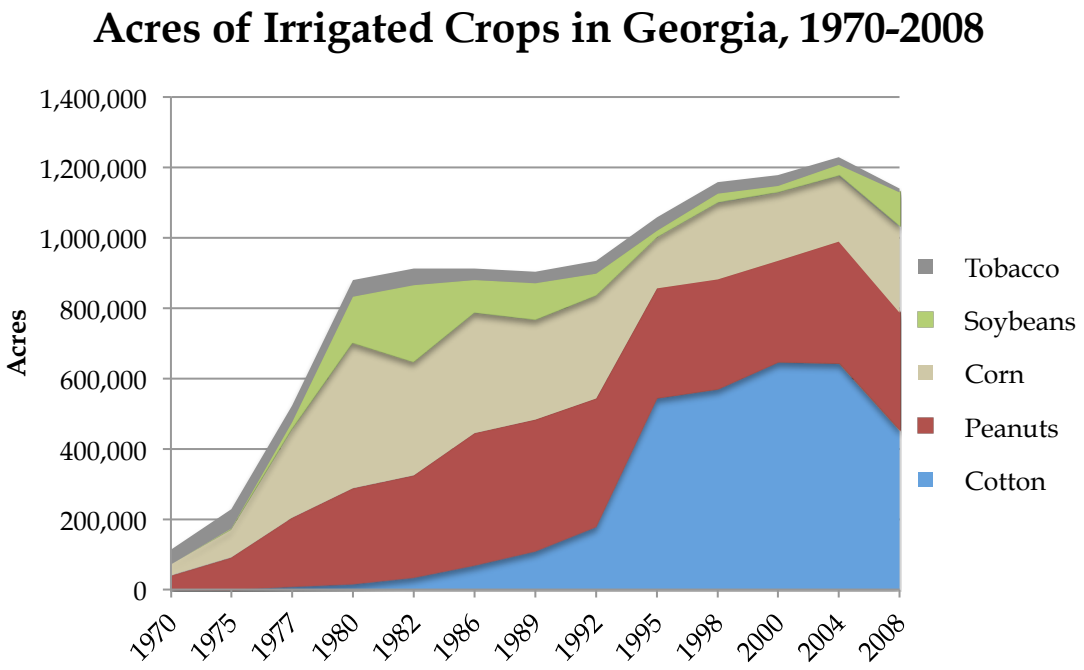

Figure 8. Acres of Irrigated Crops in Georgia, 1970-2008[44]

[42] National Environmentally Sound Production Agriculture Laboratory, "Georgia Irrigated Area by Crop," www.nespal.org/sirp/agwateruse/facts/survey/areabycrop.asp.
[43] Id.
[44] Id.

In 2012, 53% of Georgia's crop commodity cash receipts were attributed to peanuts and cotton.[45][46][47] The ACF Basin alone is responsible for 42.6% of the state's peanut production, with 1.416 billion pounds harvested, and 29.6% of the state's cotton production, with 412.8 million pounds harvested, in 2012 (see Figures 9 and 10, Appendix).[48] The cash receipts for the production of peanuts and cotton in the ACF Basin amount to approximately $472.9 million and $381.8 million, respectively.[49]

The Georgia Department of Natural Resources (DNR) issues agricultural water withdrawal permits to farmers for irrigation purposes, and the Georgia Soil and Water Conservation Commission (SWCC) is responsible for installing and monitoring meters for these permitted withdrawals through the Ag Metering Program (see Figure 11, Appendix).[50] In 2012, permitted agricultural irrigation water withdrawals averaged 290 MGD from groundwater wells and 73 MGD from surface water intakes.[51]

While surface water has its own uniquely intricate web of legal convolutions, groundwater is even more complex. As opposed to surface water, which can be visually assessed when there is low flow, groundwater and its relative abundance cannot be seen by the naked eye. Assessment of groundwater quantity requires knowledge of the geological structure of both the ground and aquifer(s) and instruments to measure and monitor the water levels.

In the event of a statewide drought, as declared by the Director of the Georgia Environmental Protection Division (EPD), surface water intakes for irrigation may be limited or prohibited. As a result, farmers must then rely on groundwater withdrawals, which are not limited by EPD, for their irrigation needs.

Despite the bad wrap agriculture gets in the realm of the Tri-State Water Wars, Georgia is currently engaged in active research to increase the efficiency of large-scale

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[45] NASS US Department of Agriculture, Georgia Field Office, "Georgia County Estimates: Peanuts 2011-2012."
[46] NASS US Department of Agriculture, Georgia Field Office, "Georgia County Estimates: Cotton 2011-2012."
[47] See Supra 41.
[48] Id.
[49] Id.
[50] Georgia Soil and Water Conservation Commission, "Metering Program," http://gaswcc.georgia.gov/metering-program
[51] Georgia Soil and Water Conservation Commission. "Permitted Irrigation Withdrawals in Georgia, by 8-Digit Huc (Open Records Act Request),"(2014).

irrigation systems; some companies and farmers have taken it upon themselves to perform similar research. Electronic irrigation monitoring and control systems that determine the schedule and amount of irrigation based on soil moisture monitors and atmospheric conditions are among the areas of advancement that may prove to be effective in reducing agricultural water demands in the state.

II. Alabama

Only a small portion of the ACF Basin lies within the state of Alabama. The eastern part of the state utilizes these waters for a series of uses; however, the largest single water withdrawer is the Joseph M. Farley Nuclear Plant in southeast Alabama.

Farley Nuclear Plant

The Joseph M. Farley Nuclear Plant (Plant Farley) sits on 1850 acres along the Chattahoochee River in Houston County, southeast Alabama.[52] The plant is owned by Alabama Power Company and operated by Southern Nuclear Operating Company, both of which are subsidiaries of Southern Company. Plant Farley consists of 2 units, each unit containing a 3-loop Pressurized Water Reactor (PWR) rated at approximately 910 megawatts per unit.[53] Construction of Plant Farley began in 1972, and Unit 1 was commercially operational by December 1977. Unit 2 came online in July 1981.

While, once constructed and commercially operational, nuclear energy is one of the cheapest and most efficient sources of electricity, the generation process requires large volumes of water to maintain the cooling systems of the plant. The circulating water systems (CWS) cool the condenser by transferring heat to the steam towers, where heat is released via evaporation. One of the chief dangers is a loss of cooling water, causing a buildup of heat that could damage or melt the fuel rods and potentially cause a reactor meltdown.[54] In the event that flows of the Chattahoochee River are insufficient to sustain the plants cooling systems, the plant would be required to shut down one or both of the reactors.

Plant Farley's water withdrawals are almost entirely sourced from the Chattahoochee River to maintain the plant's cooling systems, with the exception of

[52] Southern Nuclear, "Joseph M. Farley Nuclear Power Plant - Units 1&2 Pressurized Water Reactors Fact Sheet,"(Southern Company, 2011).
[53] Nuclear Energy Institute, "Nuclear Energy in Alabama." 2014.
[54] Id

0.3025 MGD of groundwater withdrawals.[55] The withdrawals fluctuate throughout the year but can reach as high as 120 MGD; however, Plant Farley discharges the majority of its withdrawals back into the Chattahoochee River (see Figure 12).[56] The plant's net surface water withdrawals average at approximately 15.47 MGD for 2012.[57]

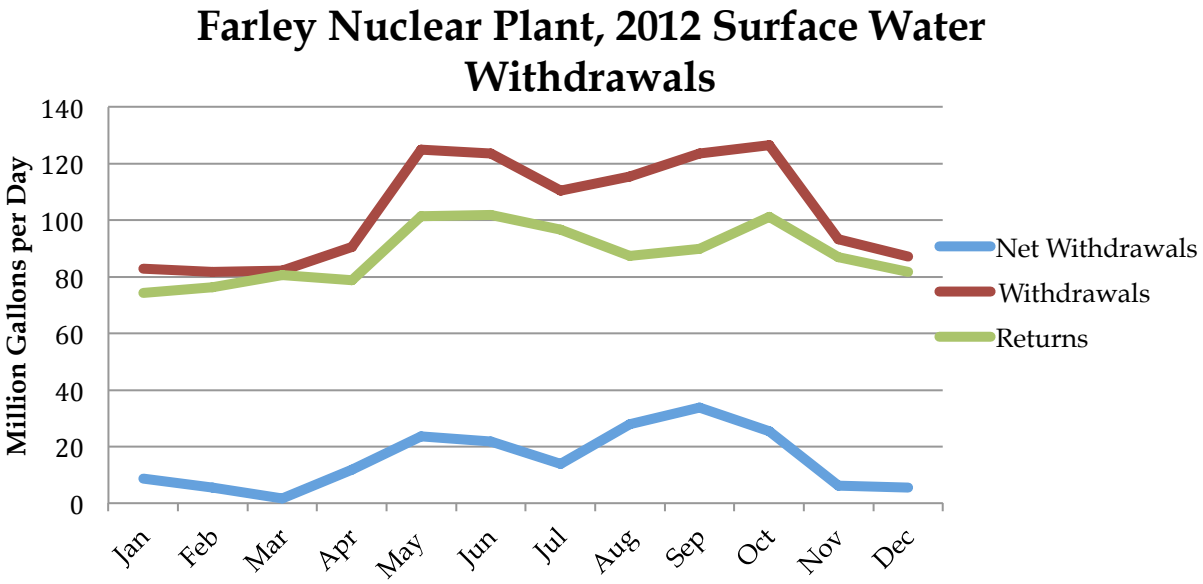

Figure 12. Plant Farley Surface Water Withdrawals[58]

To estimate the value of the electricity generated by Plant Farley, several considerations must be taken into account. Nuclear energy accounts for 27% of Alabama's net electricity generation, and Plant Farley accounts for 34% of that portion (see Figure 13).[59] So, Plant Farley provides roughly 9% of the state's electricity. By pairing the average price of electricity for each end-use sector with the electricity sales in each sector, the estimated revenue attributed to Plant Farley's net generation in 2012 is approximately $681 million.[60]

[55] Alabama Department of Economic and Community Affairs, "Alabama Water Withdrawals in the Acf River Basin (Open Records Act Request),"(2014).
[56] Id.
[57] Id.
[58] Id.
[59] US Energy Information Administration, "Electric Power Annual (2012 Data)," Boston Globe, June 11, 2002, third edition, LexisNexis Academic.
[60] Id.

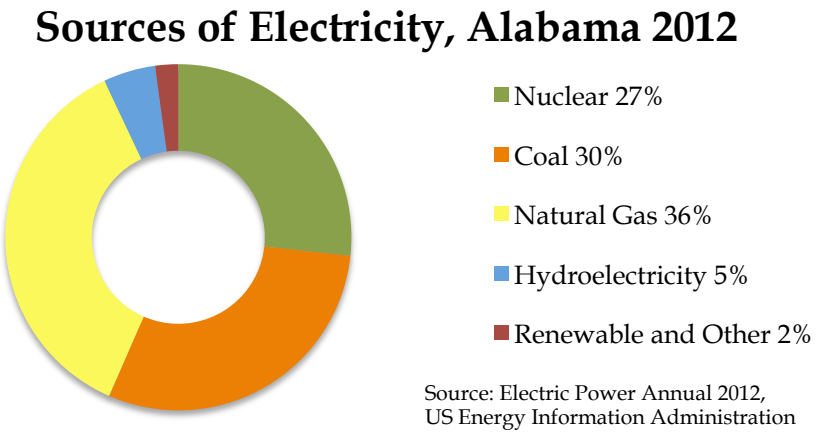

Figure 13. Sources of Electricity in Alabama[61]

However, this is merely a representative estimate; Alabama has territorial electricity coverage from both TVA and Southern Company. The task of assessing the true value of Plant Farley's electricity generation and the opportunity cost of shutting down the plant, due to inadequate water supplies, requires proprietary data regarding fuel and input prices, neither of which was available for this study.

III. Florida

At the confluence of the Chattahoochee and Flint Rivers is Lake Seminole, the reservoir created by the Jim Woodruff Dam. Woodruff Dam is located on the Georgia-Florida state line, and water leaving the dam is the Apalachicola River. The river flows 112 unimpeded miles before reaching Apalachicola Bay, where the river's fresh water mixes with the salt water of the Gulf of Mexico (see Figure 14, Appendix). These brackish waters are home to a number of aquatic species that have significant economic value in the local seafood industry of Franklin County, Florida; of particular importance is the Eastern Oyster, which has historically been a critical component of the local economy. Upstream from Apalachicola Bay, the proliferation of 4 federally protected aquatic species relies on the river's flow and the quality of the water.

While Georgia and Alabama's predominant water demands can be quantified as volumetric withdrawals, Florida's claims in the Tri-State Litigation are not directly comparable.

Apalachicola Bay Oysters

[61] Id.

Apalachicola Bay oysters typically rely on freshwater flows for the phytoplankton it consumes as food; reduced river flows directly correlate with a decrease in food availability. But there is another implication of reduced freshwater flows into the Bay. As river flows decrease and the bay's salinity increases, oyster populations become more vulnerable to oyster predators that move into the bay from the Gulf and feed upon the oysters, including crown conchs, southern oyster drills, stone crabs, and boring clams.[62]

Figure 15. Map of Oyster Beds in Apalachicola Bay.[63]

[62] Circle of Blue, "Florida Oyster Harvest Suffers as Drought Intensifies Water Battle with Georgia and Alabama," http://www.circleofblue.org/waternews/2012/world/florida-oyster-harvest-suffers-as-drought-intensifies-water-battle-with-george-and-alabama/.
[63] US Geological Survey, "Map of Apalachicola Bay Floor," in *Open-File Report 2006-1381*(2007).

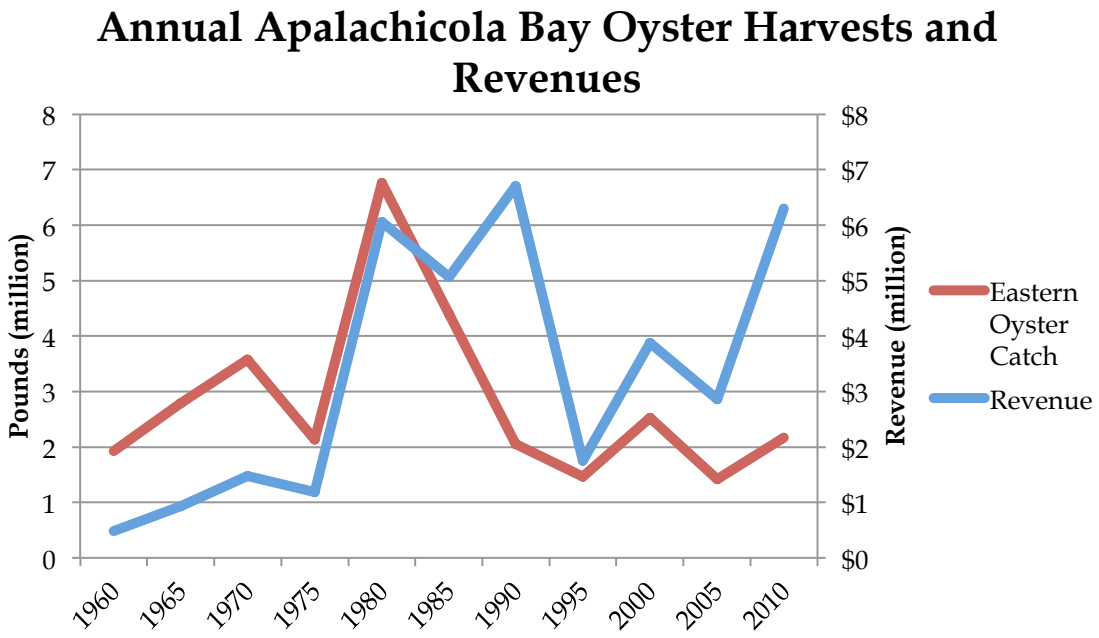

Figure 16. Apalachicola Bay Oyster Harvests and Revenues[64]

Historically, the Apalachicola Bay oyster industry has accounted for roughly 10% of the US supply of oysters.[65] In 2012, the dockside values of Eastern Oyster catches in Apalachicola Bay were approximately $8.3 million.[66] While the local economy depends on these oysters, the saving grace may come from the threatened and endangered aquatic species living just upstream from the bay.

Endangered and Threatened Species

Independent of the social and economic claims, regarding the Apalachicola Bay oyster and seafood industry, is what may be the Florida's most compelling legal argument in the Tri-State Water Rights Litigation, the threatened and endangered aquatic species living in throughout the Apalachicola River. Section 9 of the Endangered Species Act (ESA) prohibits the federal government from impairing the critical habitats of listed species.[67] And so, the Corps, who operates Woodruff Dam, must ensure that the release of waters from Lake Seminole are sufficient to avoid the impairment of a listed species' critical habitat within the Apalachicola.

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[64] National Oceanic and Atmospheric Administration National Marine Fisheries Service, "Recreational Fisheries Statistics," https://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/index.
[65] Apalachicola Chamber of Commerce, "Eastpoint," http://www.apalachicolabay.org/index.cfm/m/62/sectionId/7/Eastpoint/.
[66] See Supra 64.
[67] 16 U.S.C. ch. 35 § 1531 et seq., "Endangered Species Act of 1973."

Florida stakeholders and environmental advocates in the Tri-State Litigation have turned much of their focus to the Gulf Sturgeon (*Acipenser oxyrinchus desotoi*), Fat Threeridge Mussel (*Amblema neislerii*), Chipola Slabshell Mussel (*Elliptio chipolaensis*), and Purple Bankclimber Mussel (*Elliptoideus sloatianus*), all of which are protected under ESA.[68] The Gulf Sturgeon was listed as a threatened species in 1991, and all three mussels were listed under the ESA on March 16, 1998; the Fat Threeridge Mussel was listed as endangered, while the other two mussels were listed as threatened.[6970] Critical habit was designated for the Gulf Sturgeon in 2003 and the three mussel species in 2007.[71]

The issue is further complicated by life cycle considerations. Freshwater mussels in the Apalachicola River depend on fish hosts to harbor, transport, and disperse their eggs. The female mussels, whose eggs have been previously fertilized, typically lure a fish host into close proximity by using its mantle flap to mimic fish prey; once the fish is within range, the mussel jettisons its eggs into the water column.[72] Ideally, some of the eggs will latch onto the fish's gills and or fin, where they will remain until their growing size and weight cause them to fall from the fish's gills to the streambed and grow into adults.[73] Thus, to protect an endangered mussel species, the minimum flows should not only be adequate for the mussels themselves but any host fish species, as well.

Once completed, the Corps' Environmental Impact Statement (EIS) for its updated Master Water Control Manual for the ACF will address the dangers posed to these federally protected species and, hopefully, determine adequate minimum flows to ensure the safety of these species.

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[68] Richard Hamann, "Can the Endangered Species Act Save the Apalachicola?," *Georgia State University Law Review* 29, no. 4 (2013).
[69] 56 Fed. Reg. 49653 (Sept. 30, 1991)
[70] 63 Fed. Reg. 12,664 (Mar. 16, 1998)
[71] See Supra 68.
[72] Warm Springs Nationall Fish Hatchery US Fish and Wildlife Service, "Freshwater Mussels," http://www.fws.gov/warmsprings/fishhatchery/species/mussels.html.
[73] Id.

Section 4: Recommendations and Conclusion

The Supreme Court will likely decide and announce whether or not it will take the Florida v. Georgia case before the end of the year. In the meantime, the lawsuit hangs in limbo and each party is left to speculate the implications of an equitable apportionment mandate that may be handed down by the Supreme Court. Original jurisdiction cases, such as this one, are very rare, and we now stand on the verge of groundbreaking judicial history.

The most compelling claim in the pending Supreme Court case is Florida's assertion that minimum flows are necessary to ensure the protection of threatened and endangered species living in the Apalachicola River. All other claims seem to fall second to this prerogative. Save for an equitable apportionment mandate from the Supreme Court, it is the United States Army Corps of Engineers who must make the ultimate decision as to how much water must pass through Woodruff Dam to provide minimum flows necessary to ensure the protection and proliferation of the Gulf Sturgeon, Fat Threeridge Mussel, Chipola Slabshell Mussel, and Purple Bankclimber Mussel. Given the likely outcome that minimum flows are established for particular portions of the ACF Basin, it is worth discussing how the states might need to adapt their water policies to accommodate these requirements.

2012 ACF Water Withdrawals and Revenue by State and Category			
Category	**Withdrawals** (mgd)		**Revenue** (million)
	Ground	**Surface**	
Georgia			
Municipal Metro Water District	-	**488**	**$529***
Agricultural Self-Supplied	**290**	**73**	**$855**
Alabama			
Farley Nuclear Plant	-	**104**	**$681**
Florida			
Apalachicola Oysters	-	-	**$8**
ACF Totals	**290**	**665**	**$2,074**

* For *only* Gwinnett County and the City of Atlanta in 2008 and 2010, respectively.

Figure 17. ACF Water Withdrawals and Revenues.[74]

With the majority of the ACF Basin contained within its borders, Georgia has the largest margin for improvement in water efficiency. While Metro Atlanta has made

[74] See Supra 38-40, 41, 45-46, 56, 60, 65.

efforts to reduce its water demand, more aggressive programs and actions must be taken if Metro Atlanta plans to meet its growing water demand with ultimately the same supply of water. Water rate increases are a very unpopular means of addressing this issue and can be politically inconvenient. Given that all of Metro Atlanta's citizens require a minimum threshold of water for life's basic needs, charging a higher price for water has a more detrimental impact on low-income individuals than those with higher income. Georgia is currently interested in constructing additional reservoirs to meet its future demands. However, if Metro Atlanta is going to address the underlying drivers of its increasing water demand in the interim, it should invest in more aggressive water efficiency programs, such as widespread leak detection and repair and rebates and incentives for low-flow plumbing retrofits. There is no singular solution to the issue of Metro Atlanta's growing water demands that can be executed in one fell swoop. The solution requires a multifaceted approach, including a substantial financial investment that will literally and figuratively pay off in the long run.

Georgia's current research and investment into increasing large-scale agricultural irrigation efficiency is certainly a step in the right direction. Faced with the prospect of increasing variability in seasonal precipitation, the state should continue to invest in programs targeting irrigation efficiency, monitoring, and conservation to reduce the agricultural sector's reliance and burden on surface and groundwater supplies.

In any case, the contention over shared resources, such as interstate water, is not something that will resolve itself. With increasing water demands, stakeholders will need to adapt in order to maintain their current quality of life, i.e., using less water to satisfy the same demand. Before the year's end, we will know whether or not the Supreme Court believes this issue is *worth* addressing. If not, then we will be left to wait for the Corps' decision on how *it* will manage the waters of the ACF Basin.

Only time can tell what happens next; so, stay tuned.

APPENDIX

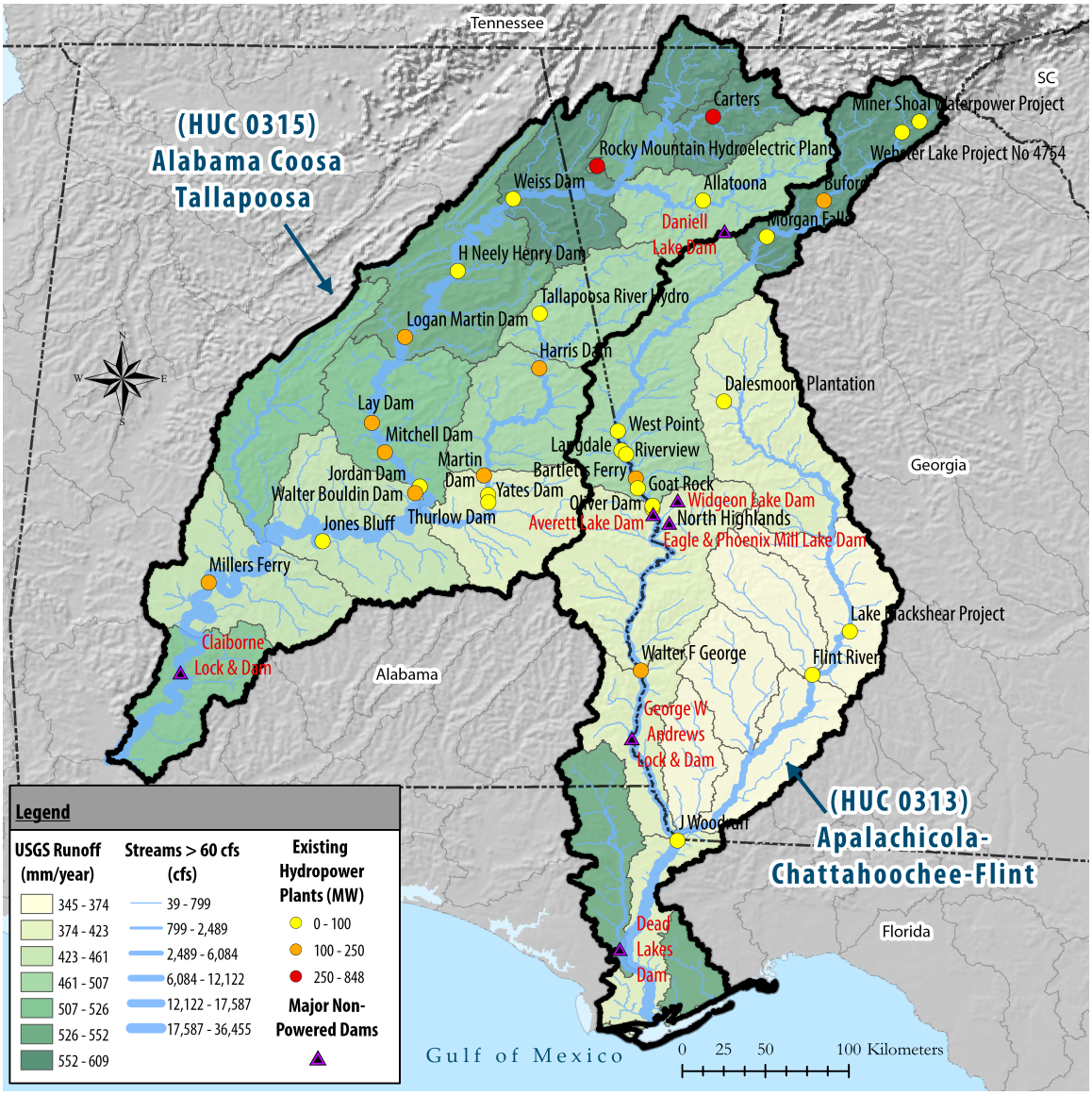

Figure 2. Dams and Rivers in ACT and ACF River Basins.[75]

[75] Oak Ridge National Laboratory, "Us Nsd Hydropower Potential (Act/Acf, 2012)," in *National Hydropower Asset Assessment Program*(US Department of Energy, 2012).

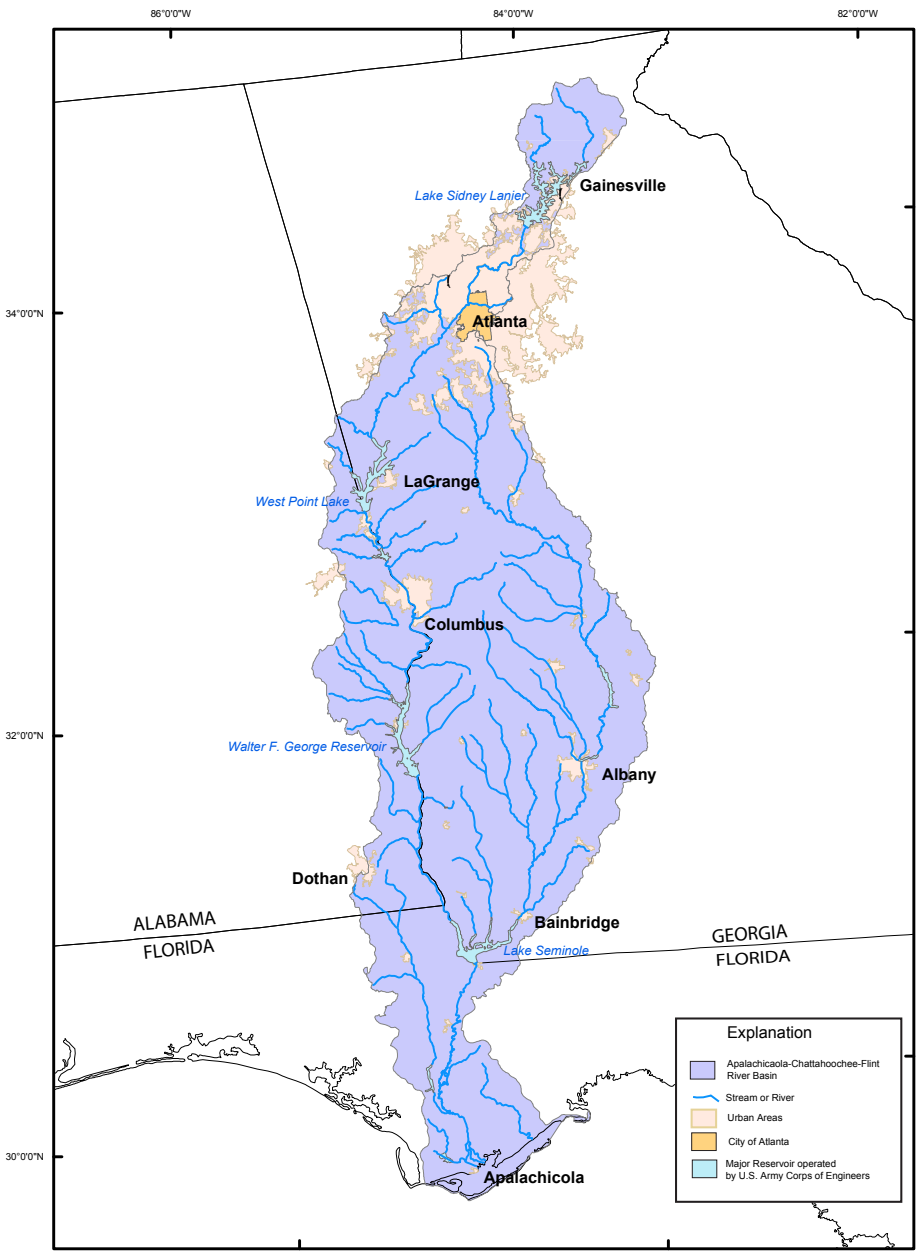

Figure 3. Major Cities and Urban Areas in ACF Basin.[76]

[76] US Geological Survey, "Apalachicola-Chattahoochee-Flint River Basin Focus Area," in *National Water Census* (2014).

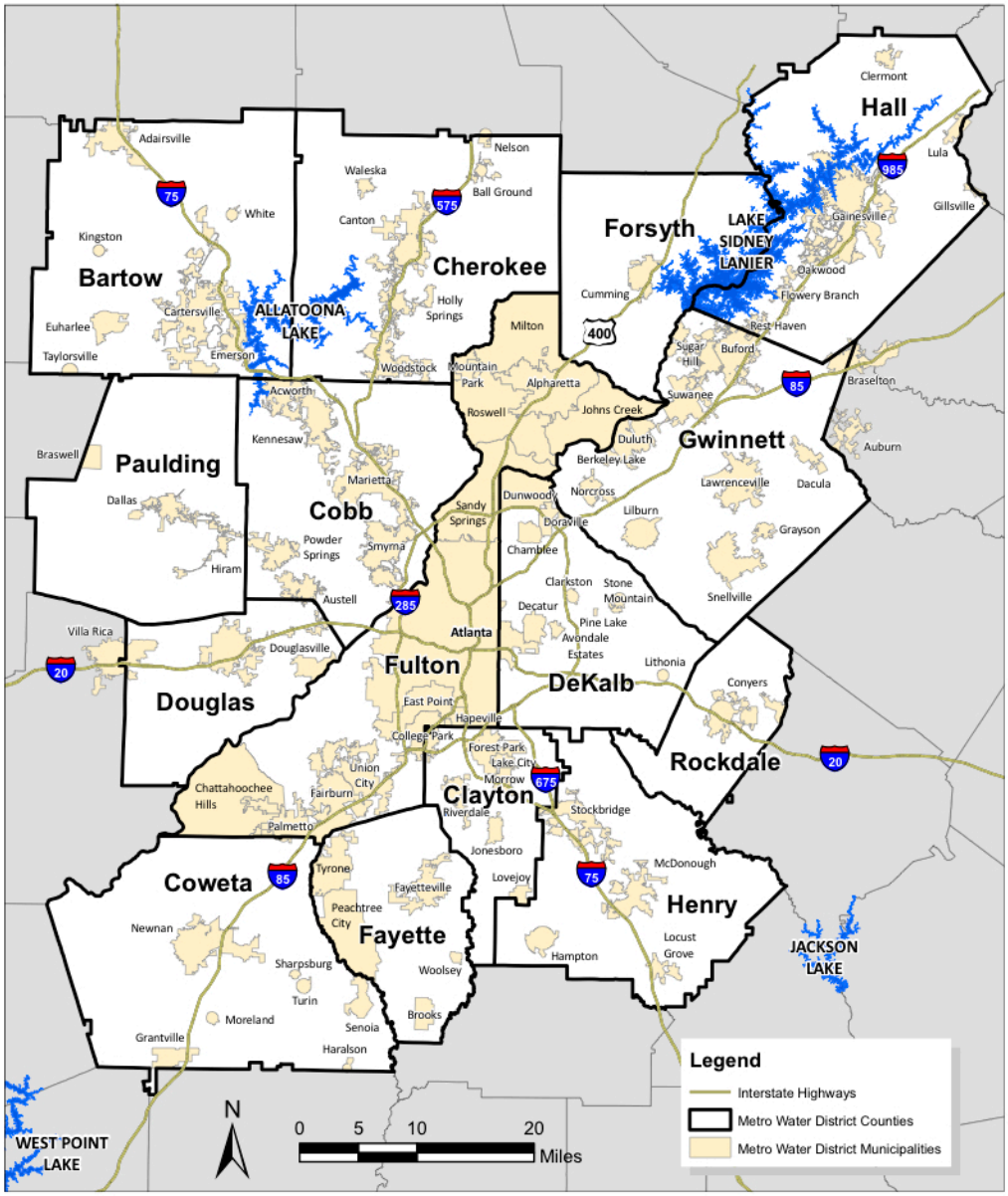

Figure 6. Metropolitan North Georgia Water Planning District.[77]

[77] Atlanta Regional Commission, "2010 Water Metrics Report." Metropolitan North Georgia Water Planning District. 2012.

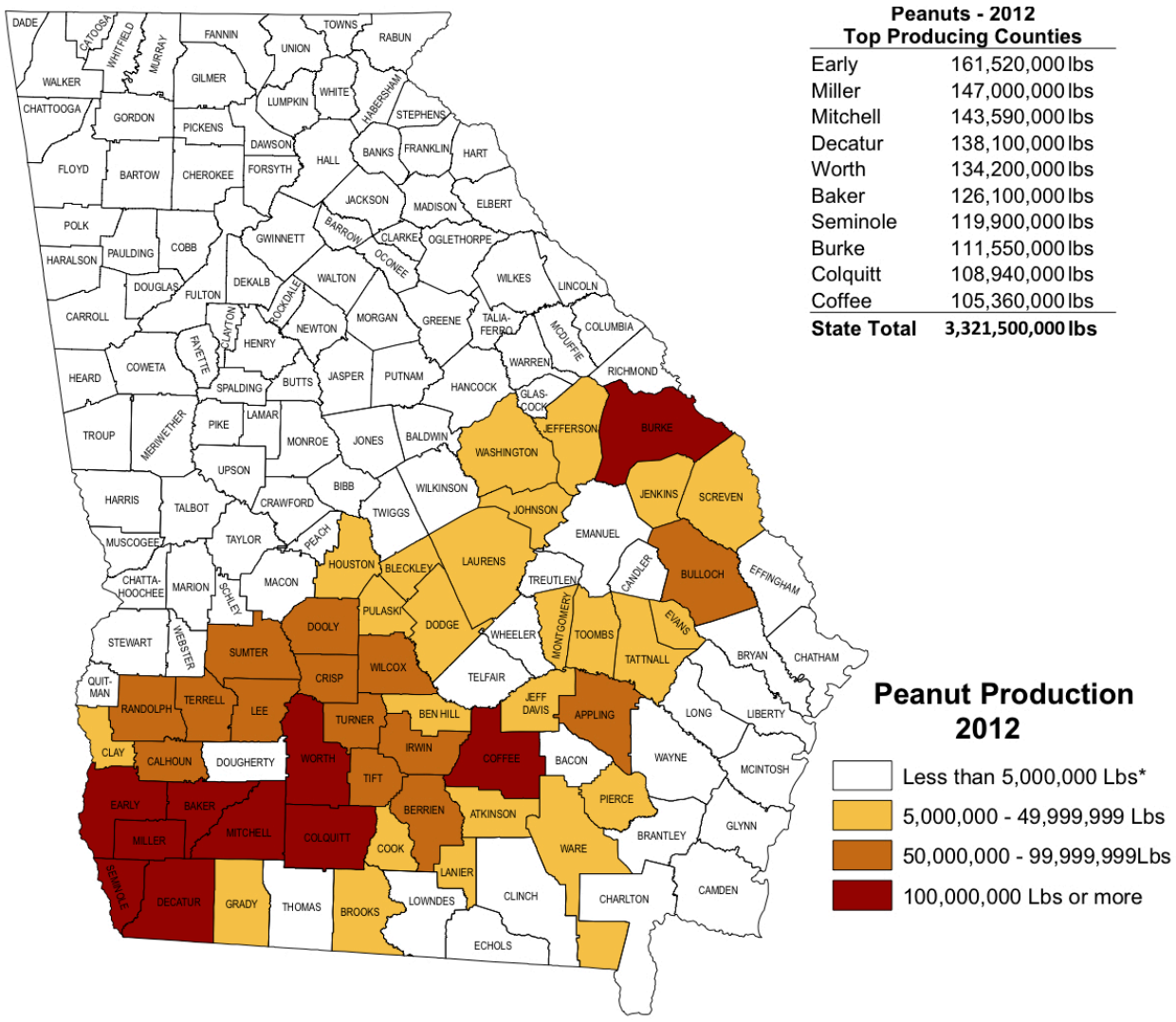

Figure 9. Georgia Peanut Production by County.[78]

[78] US Department of Agriculture, "Georgia County Estimates: Peanuts 2011-2012."

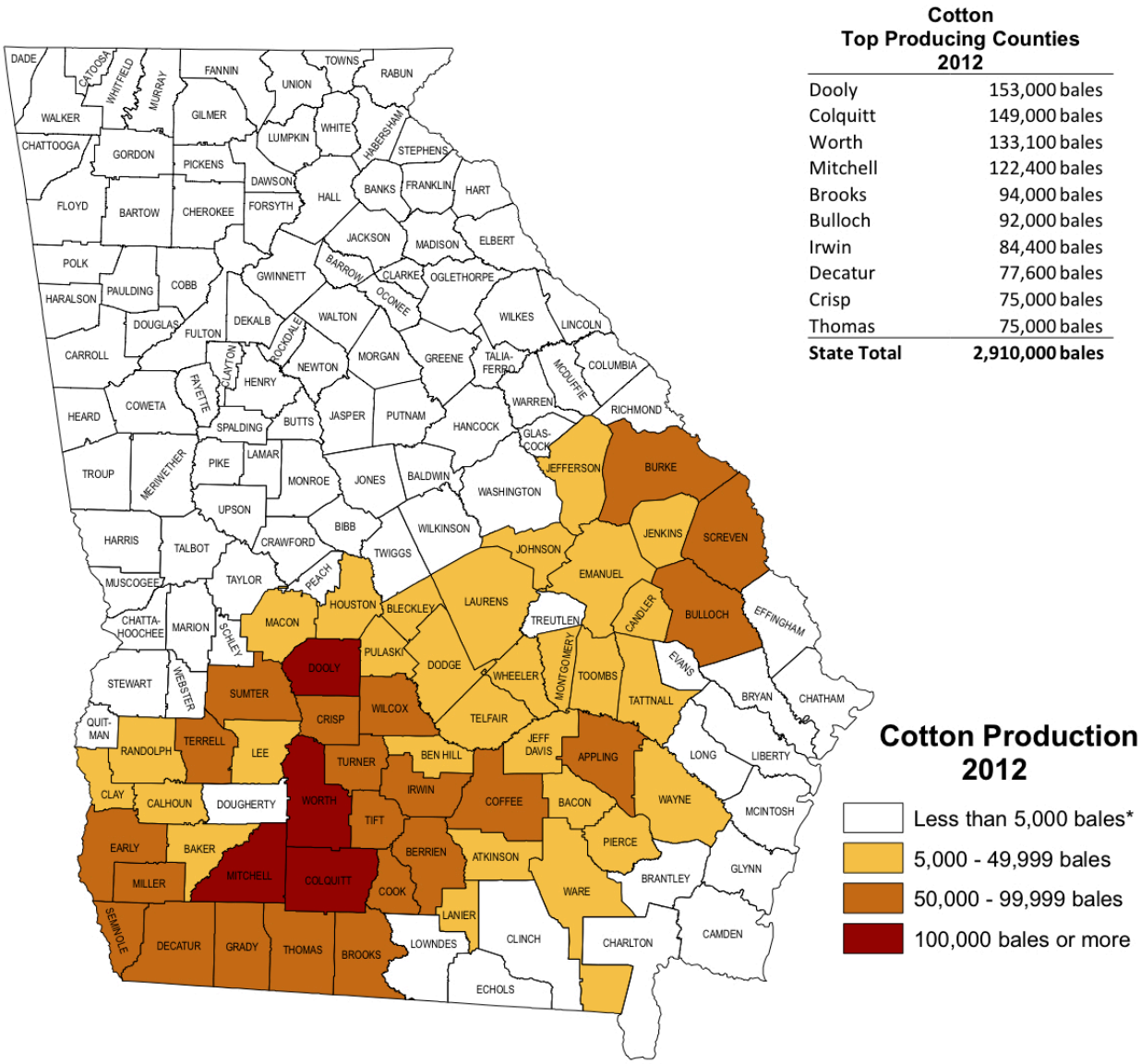

Figure 10. Georgia Cotton Production by County.[79]

[79] US Department of Agriculture, "Georgia County Estimates: Cotton 2011-2012."

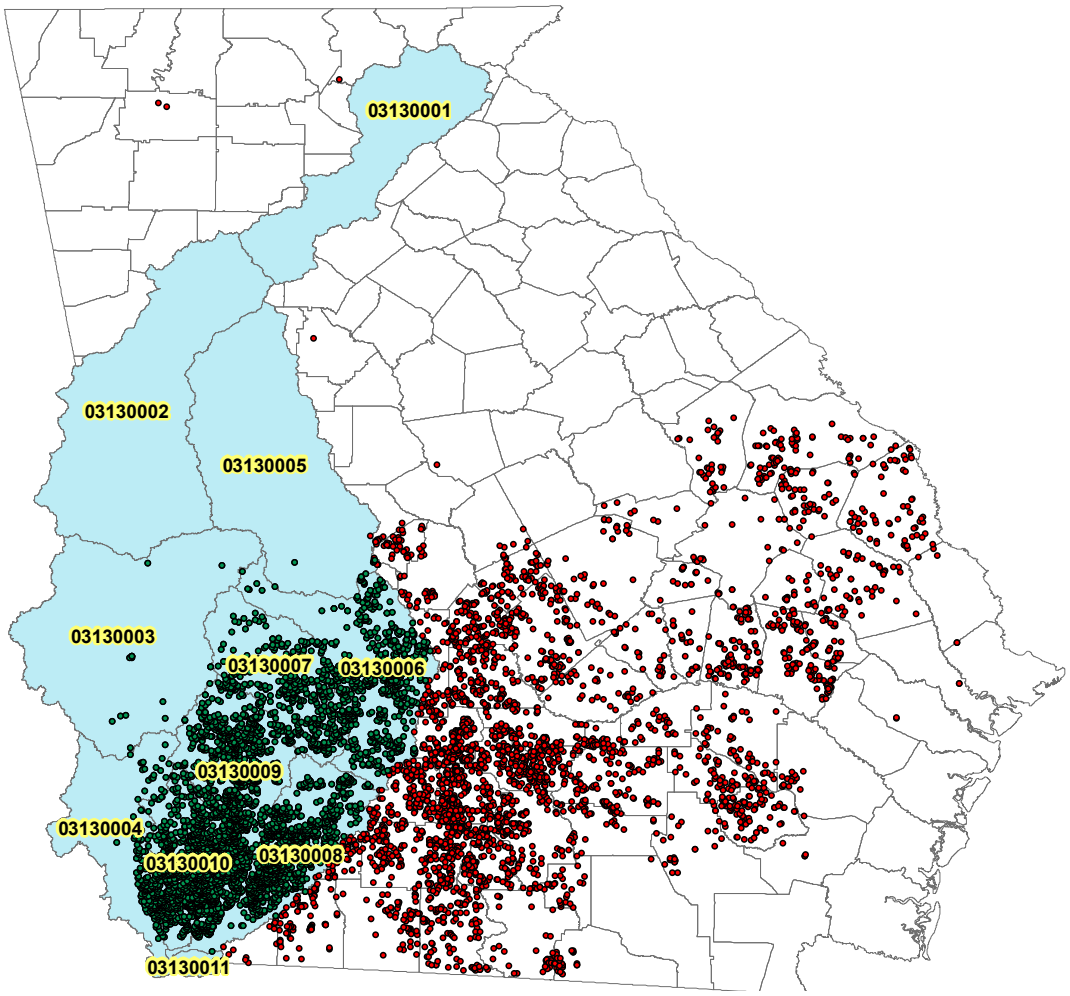

Figure 11. Permitted Agricultural Irrigation Groundwater Wells in ACF Basin.[80]

[80] Bryan Johnson, "Permitted Groundwater Irrigation Wells (Open Records Act Request),"(Georgia Soil and Water Conservation Commission, 2014).

Figure 14. Map of Apalachicola Bay, Florida.[81]

[81] US Geological Survey, "Map of Apalachicola Bay," in *Open-File Report 2006-138* (2007).

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